

THURSDAY, MARCH 13, 1879

## THE UNITED STATES FISHERIES

United States Commission of Fish and Fisheries—Report of the Commissioner for 1875-76. (Washington: Government Printing Office, 1878.)

THE series of volumes now being issued by Mr. Spencer Baird, Fishery Commissioner of the United States, of which the fourth has just reached us, is in every way remarkable. As a much required contribution to our scanty knowledge of fishery economy and the natural history of American food fishes, it presents a mass of very valuable information; the details incidental to the propagation of carp and salmon are particularly interesting, not only because they show the gigantic scale on which these things are done on the other side of the Atlantic, but also because of what they teach as to the mode of doing them. The historic and economic sketches of the fish and fisheries of various other nations are likewise full of interest, Mr. Baird having allowed nothing to escape which he thinks will illustrate his subject or render testimony to the value of the work in which he is engaged.

The contents of the present volume, if not so varied as those of some of its predecessors—over 750 of its pages being devoted to a historical account of the American whale fishery—are certainly not less interesting. There is a report on the fisheries of Chicago and vicinity, which, we are told, yield annually about 12,000,000 lbs. weight of fish; there is also an article on the condition of the salmon fisheries of the Columbia River, from which we have recently been receiving enormous consignments of canned salmon; the present volume likewise contains notes on the fishes of the Delaware, together with an abundant supply of information regarding the propagation of various of the minor food fishes of America.

We are not in the least surprised to learn that a diminution of the supplies of Columbia River salmon (*Salmo quinnat*) has taken place. These fish, consequent on being free to all who choose to capture them, have given constant employment to about fifteen "canneries" during ten or twelve years, each of which, if we strike an average, will turn out a million pounds weight of fish per annum. There are various kinds of salmon in the Columbia River, but there seems to be some confusion regarding their proper identification; that we have mentioned is the one which is captured for the canneries. It will probably be found on further investigation that one or two of the so-called varieties are simply the same fish in different stages, as in the case of *Salmo salar* and the "grilse;" fish of all sizes being, we are told, found together in the Columbia and its tributaries. It is rather singular that no very large salmon are found in that great stream. Mr. Livingstone Stone who reports to the Commission on the subject, says that the largest salmon he ever saw had a girth of 31 inches, and was 35 inches in length and weighed 65½ lbs. One which was said to have weighed 83 lbs. was reported to Mr. Stone by a fisherman who saw it. The average weight of the Columbia salmon (*Salmo quinnat*) is from 22 to 23 lbs. whole, but when dressed for market only about 17 lbs. The ratio of salmon growth has never been

accurately determined. Some large salmon (*Salmo salar*) are captured in the salmon streams of Scotland, but the age of such fish cannot be set down with any certainty. In a report made by Mr. Stone given in a previous volume of Mr. Spencer Baird's reports (1872-73) regarding the Sacramento salmon, it is mentioned as a "theory" that salmon are full-grown at the age of about three years. We commend this question of salmon growth to the farther notice of Mr. Commissioner Baird. In the United Kingdom the evidence obtained on this point has hitherto been of the most contradictory nature. Our own opinion is that salmon are never "full grown," or rather that as long as they are alive they continue, under proper conditions of food and living room, to increase in weight and size. After much weighing of evidence we recently came to the conclusion that a fish which we handled in August last (1878), and which weighed 54 lbs., was at least nine or perhaps ten years old. From some inquiries which we are making, we hope to be provided with sufficient data for a settlement of the question during next fishing season. Returning for a moment to *Salmo quinnat*, the following notice of the periods and strength of its migration may be useful for comparison with the habits of *Salmo salar*:—"The salmon make their first appearance in February, though in very small numbers; the main body arrives in May, June, and especially in July, when the run is enormous. The May salmon are largest. Perhaps the most correct view to take of the running of the salmon is to consider all the salmon as included in one run, beginning in February, increasing in May and June, and culminating in July, though they might also be legitimately divided into three runs, the first or meagre run coming in February, March, and April, the second or full run in May and June, and the third or maximum run in July. After July they diminish very rapidly, and soon almost entirely disappear from the river."

It is at present being considered, we believe, whether or not it will be necessary to resort to "pisciculture" on the Columbia river. Would it not be better to limit for a time the spoliation of the water? At present no check whatever is placed on the fishery, and each "cannery" captures and tins all the salmon that it can find, and with each establishment working up a million pounds' weight per annum, the complete exhaustion of the supply is only a work of time, as has been demonstrated in our own rivers.

The artificial hatching of salmon is conducted in the United States on quite a gigantic scale. A table is given in the report of "operations on the McCloud river in 1876," from which we learn that on one day, Sept. 4, over a million salmon eggs were obtained by a process of artificial spawning. During the years 1874-75 and 1876, the number of ova taken for despatch to different rivers was 21,877,300. In 1875, 8,629,300 eggs were secured, which, at the British rate of a thousand eggs for each pound of salmon weight, represents the handling of a large number of fish. The cost of collecting the spawn is about four shillings per thousand. The eggs taken in the McCloud river are widely distributed, some being sent to Canada and a portion to New Zealand.

Much valuable information is given in the present series of reports on the best modes of salmon hatching, and the

careful observations of temperature made during the manipulation are tabulated for future use. With reference to *Salmo quinnat* of the Sacramento, it may be confidently affirmed that there is almost no difference between it and *Salmo salar*, which, in form and habits, it closely resembles; it has, however, if we mistake not, more rays in the anal fin, and is of course able to endure a higher temperature: the eggs mature in summer and hatch in the autumn. In ascending to their spawning grounds the *gravid* fish must frequently pass through river water having a temperature of over 76°. We were not prepared for the following remarkable statement from New Zealand, made in the present volume (p. 989):—"So far as yet observed, the adult fish all die after spawning, and never return to the sea." This fact is stated in a "memorandum respecting the American salmon and white fish recently introduced in New Zealand by Dr. James Hector, of the Colonial Museum, Wellington." We shall be glad to have some authoritative statement with regard to the above fact, as without some explanation it seems too extraordinary for belief.

An interesting account of the distribution and habits of the "Shoodic salmon" is given in the present volume. These fish, *Salmo sebago*, are known as "land-locked salmon," at one time probably in communication with the sea, but now shut out from it altogether, and thus forced to pass their lives in fresh water for ever. There is, however, no evidence that "the supposed change of habits—the abandonment of the seaward migrations—came about in such a way as the term, *land-locked*, implies." Mr. Atkins, in his report to the commissioner, makes a statement which we should like to have explained. In collecting the spawn of the "Shoodic salmon," there was taken, he says, a single female specimen of *Salmo salar*; "she yielded 10,000 eggs, which were impregnated with the melt of the 'Shoodic salmon; ' they developed well, and hatched into vigorous fish." But how did a female specimen of *Salmo salar* come to be among the "land-locked" fish? and what became of her?

The operations of the United States Fish Commission commenced eight years ago, and are still being prosecuted. The work has been varied, as we have indicated, and, so far, it has been well done, and the information accumulated will form a quarry which will yield a lasting supply of fishery knowledge to all inquirers.

#### THE PACIFIC ISLANDS

*Reise durch den Stillen Ocean.* Von Max Buchner. (Breslau: J. U. Kern, 1878.)

THE author of this pleasantly written and very interesting book of travel became, as he tells us, a ship's medical officer, in order to gratify his desire to see the world. He sailed in an emigrant ship from Hamburg to New Zealand and returned home by Fiji, the Sandwich Islands, San Francisco, and the Pacific railroads. He made a considerable stay at New Zealand, Fiji, and the Sandwich Islands, and the chief interest of his book lies in the accounts of what he saw at these places. Though there is little new information in the work the descriptions are extremely good.

On board the emigrant ship there devolved on him not only the usual medical work but also the entire charge

and government of the 397 emigrants and the division of rations amongst them. He draws a very unpleasant picture of the dangers and sufferings incurred by passengers in such a vessel. The captain seems to have known little of his business. After a narrow escape of collision the ship appears to have incurred a still narrower risk of running on the Goodwin Sands, and on the open ocean there seems to have been constant doubt as to longitude. A terrible picture is drawn of the sufferings of the emigrants—a mixture of Poles, Scandinavians, Germans, and Dutch—in a storm. The captain, who in such voyages receives a small percentage on the profits of the voyage from the owners of the ship, made constant attempts to cut short the allowance of food to the passengers. The author, who acted in the interests of the New Zealand Government and their emigrants, had great difficulty in making the captain, who cursed and swore and hammered the table with his fist when appealed to, act up to the details of the contract in the matter of rations. Even then the food seems to have been insufficient, and the salt beef was constantly being stolen, the beef tub being forcibly broken open for the purpose. The barbarous old custom of shaving on crossing the line was carried out, but we are glad to find that only volunteers amongst the emigrants were operated on. An outbreak of typhoid fever occurred on board before New Zealand was reached and caused nine deaths.

The author gives a most interesting and lively account of the present condition of the Maoris. At Lake Taupo there is now a very good clean hotel kept by a German and an Italian; and a Maori, who goes by the name of Mr. Jack, has established himself as guide of Taupo. He has constructed a bathing-place at the hot springs with a room over the bath and dressing-room, and charges a shilling for each bath. Close by, but hidden in the vegetation, our author discovered an equally good or better natural hot bathing-place, but the crafty Maori had filled it with dirt for fear it should compete with his own. At Ohinemotu on the south shore of Lake Rotorua, where are the principal hot springs, there are two good hotels for tourists and a population of about 300 Maoris. Every evening the greater part of the population turn out and bathe together in a small bay of the lake which is kept constantly warm by the hot springs, and whites and browns of both sexes swim about and sit in the warm mud together, conversing for hours at a time. Close by the bathing-place are a group of huts, the owners of which are dead, and which are tabu, and are described as full of ancient native implements, spears, adzes, wood-carvings, and other desiderata for ethnological museums, but which no one dares to touch. A performance of the "haka," the old New Zealand dance, was got up for the author and his friends, on their paying a sovereign a-piece, but the young Maoris seem not to care for the dance any longer, and to perform it only for the benefit of tourists for money, and the performance lacked spirit, and soon came to an end. The hula, hula, in the Sandwich Islands, seems to be dying out in the same manner, and in Tahiti, when the old lascivious dances are performed, they are usually got up for the benefit of European visitors, through the agency of the native washermen, who combine such offices with their legitimate business. The young Polynesians in New Zealand, as elsewhere, prefer the waltz